UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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7590	12/14/2004		DASTOURI, MEHRDAD

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2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-35* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-7,11-13,15,17,18,28 and 31-34* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *13 August 2001* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1, 2, 7, 11-13, 15, 17, 18, 28 and 30-33 are rejected under 35 U.S.C.

103(a) as being unpatentable over Hekstra et al., (hereinafter Hekstra), (EP 0 940 996

A1).

Regarding Claim 1, Hekstra discloses a method of evaluating quality of a second

image (Figure 4, Signal Y_{out} (11); Page 5, Paragraphs 0042 and 0043) reproduced from

a first image (Figure 4, Signal Y_{in} (10); Page 5, Paragraphs 0042 and 0043), said

method comprising the steps of:

obtaining a first edge image from the first image using an edge filtering process

(Figure 4, Signal X_{in} (15); Page 5, Paragraphs 0044 and 0045);

obtaining a second edge image from the second image using the edge filtering

process (Figure 4, Signal X_{out} (16); Page 5, Paragraphs 0044 and 0045);

wherein each of the first image, the second image, the first edge image and the

second edge image comprises a plurality of pixels arranged in a same array of pixel

locations (The image signal and the edge signal pixels are arranged in a same array of

pixel locations as depicted in Figures 3a and 3b), and each of said plurality of pixels has

a pixel intensity (Inherent characteristic of pixels), and wherein the pixel intensity at a

pixel location of the first edge image is indicative of whether an edge is present in the first image at said pixel location, and the pixel intensity at a pixel location of the second edge image is indicative of whether an edge is present in the second image at said pixel location (Substantial change in the pixel intensity at a pixel location in comparison with the neighboring pixel intensities is indicative of an edge at that pixel location.); and

for a given pixel location,

determining a first value indicative of a difference between the pixel intensity of the first edge image and the second edge image, if an edge is present in the first image at said given pixel location (Figure 4, Signal $(X_{out} - X_{in})^-$ (24); Page 5, Paragraph 0047. This corresponds to edges omitted in the second image or output signal which are present in the first image or input signal.);

determining a second value indicative of a difference between the pixel intensity of the first edge image and the second edge image, if an edge is present in the second image but not present in the first image at said given pixel location (Figure 4, Signal $(X_{out} - X_{in})^+$ (23); Page 5, Paragraph 0047. This corresponds to edges introduced in the second image or output signal which are not present in the first image or input signal.); and

summing the first value and the second value for providing a summed value ((Figure 4, Signal $(X_{out} - X_{in})$ (19); Page 5, Paragraph 0046).

Hekstra does not explicitly disclose providing the sum of the first and second values as a measure of the quality.

Signal $[(X_{out} - X_{in})^-, (24)]$ and $[(X_{out} - X_{in})^+, (23)]$ are mutually exclusive signal that their values have been utilized in Formulas (1) through (4) as quality indicators (Page 6, Paragraphs 0055-0057). Sum of these signals, Signal 19, will be also a measure of quality (Official Notice).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to sum the first value and the second value (mutually exclusive values) as a measure of the quality because it will improve the versatility of the objective quality measure and will increase the accuracy and reliability of objective assessment of degraded output signals.

Regarding Claim 2, Hekstra further discloses determining an averaged value of the first value and the second value over all or part of the array of the pixel locations (Page 6, paragraphs 0055-0057).

Hekstra does not explicitly disclose determining an averaged value of the sum of the first and second values.

The same well known methodology applied for averaging the first value and the second value over all or part of the array of the pixel locations is applicable to the sum of the first and second values (Official Notice).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to determining an averaged value of the sum of the first and second values because it will increase the accuracy and reliability of the observed data and will improve the objective assessment of degraded output signals.

Concerning Claim 7, comparing the averaged value to a predetermined value for determining whether the quality is satisfactory is a well known procedure in image processing routinely implemented in the art to achieve more accurate results

Regarding Claim 11, Hekstra further discloses the method of Claim 1, wherein the first image is a color image transformable into luminance and chrominance components, and wherein the luminance component is used to provide the first edge image (Page 7, Paragraphs 0064 and 0065).

Regarding Claim 12, Hekstra further discloses the method of Claim 1, wherein the second image is a color image transformable into luminance and chrominance components, and wherein the luminance component is used to provide the second edge image (Page 7, Paragraphs 0064 and 0065).

Regarding Claim 13, Hekstra further discloses the method of Claim 1, wherein the summing of the first value and the second value is carried out with weights given to the first value and the second value (Pages 5-6, Paragraphs 0054-0056).

Regarding Claim 15, Hekstra further discloses the method of Claim 1, further comprising the step of adjusting non-linearity of the first value and second value prior to the summing step (Pages 6-7, Paragraphs 0062-0064).

With regards to Claim 17, arguments analogous to those presented for Claim 1 are applicable to Claim 17.

With regards to Claim 18, arguments analogous to those presented for Claim 2 are applicable to Claim 18.

With regards to Claim 28, arguments analogous to those presented for Claims 1, 2 and 7 are applicable to Claim 28.

Claims 30, 31 and 33 recite well known image capturing devices (digital camera, video camera and scanner) which are routinely utilized in image processing.

Regarding Claim 32, Hekstra further discloses the method of Claim 1, wherein the imaging device is an image encoder (Figure 1; Page 4, Paragraph 0034)

3.   Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hekstra et al., (hereinafter Hekstra), (EP 0 940 996 A1) further in view of Wu (WO 99/43161).

Regarding Claim 3, Hekstra does not specifically disclose the method of Claim 1, wherein information regarding whether an edge is present at a given pixel location is represented in an edge map having a plurality of pixels arranged in the same array of pixel locations as those in the original image.

Representing edge pixel location in an edge map having a plurality of pixels arranged in the same array of pixel locations as those in the original image is known in the art as disclosed by Wu (Figure 3, Just Noticeable Differences (JND) Map; Page 6, Paragraphs 1 and 2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Hekstra's invention in accordance with the teachings of Wu to represent edge pixel location in an edge map having a plurality of pixels arranged in the same array of pixel locations as those in the original image because it is a well known methodology routinely implemented in the art to correspond the original and the image pixel values in analogous matrices for simplifying further computation and image processing.

Limitations recited in Claims 4-6 are well known concepts in processing binarized

images routinely implemented in the art.

Allowable Subject Matter

4.   Claims 8-10, 14, 16, 19-27, 29, 34 and 35 are objected to as being dependent

upon a rejected base claim, but would be allowable if rewritten in independent form

including all of the limitations of the base claim and any intervening claims.

Claim 8 of the instant invention recites the method of Claim 1, further comprising

the step of determining for the given pixel location a third value indicative of a difference

between the pixel intensity of the first image and the second image, prior to the

summing step, if an edge is not present in either the first image or the second image at

said given pixel location, wherein the summing step also sums the third value, in

addition to the first and second values, for providing the summed value.

Claims 9, 10, 14 and 16 depend on Claim 8, and are therefore allowable.

Claim 19 recites the system corresponding to the methodology recited in Claim 8,

and is therefore allowable.

Claims 20-27 depend on Claim 19, and are therefore allowable.

Claim 29 recites analogous limitation as recited in Claim 8, and is therefore

allowable.

Claims 34 and 35 depend on Claim 28, and are therefore allowable.

The features identified are neither discussed nor suggested by the prior arts of

record.

Other prior art cited

5.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

U.S. Patent 5,596,364 to Wolf et al.;

U.S. Patent 5,991,458 to Kunitake et al.

Contact Information

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mehrdad Dastouri whose telephone number is (703)

305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m.

to 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Mehrdad Dastouri
Primary Examiner
Art Unit 2623
December 11, 2004

MEHRDAD DASTOURI
PRIMARY EXAMINER